

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
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THE CANADIAN REDUCED GRAVITY EXPERIMENT DESIGN CHALLENGE: EMERGING  
PARABOLIC FLIGHT OPPORTUNITIES FOR STUDENTS**Abstract**

This paper discusses Canada's first nationwide competition targeting post-secondary students to design, build, and test a microgravity flight science experiment on board a modified business jet used for parabolic flight. The Canadian Reduced Gravity Experiment Design Challenge (CAN-RGX) is a collaboration between Students for the Exploration and Development of Space (SEDS-Canada), the Canadian Space Agency (CSA) and the National Research Council of Canada (NRC), with the support of various representatives from the private space sector. The competition provides students with a platform to perform ground-breaking research in microgravity conditions, and an opportunity for up to eight students to run their experiments during a parabolic flight campaign. Four selected teams experience the complete design cycle of a real engineering project, from conceptualization and preliminary design, to manufacturing, testing, and flight. Topics covered in the paper include the competition's structure, its future roadmap, and educational benefits for the student participants. Furthermore, an overview of the four winning experiments that were selected from over 20 proposals across Canada to fly on board the NRC's Falcon 20 reduced gravity aircraft during the August 2017 flight campaign is provided. During the first edition of the competition, all four experiments were related to physical sciences, focusing primarily on studying fluid mechanics phenomena to improve 3D-printing in microgravity, and developing technologies for asteroid mining and in-situ resource utilization. In the future, the competition will incorporate life science experiments to study the biological and physiological effects of reduced gravity environments and their implications to human spaceflight. By continuing this initiative in future years, SEDS-Canada aims to empower students in Canada to become the next generation of microgravity researchers.